A Case Study:

Sustainable Design to Support Real World Undergraduate Education in the Natural Sciences

A presentation for:

School of Mathematics
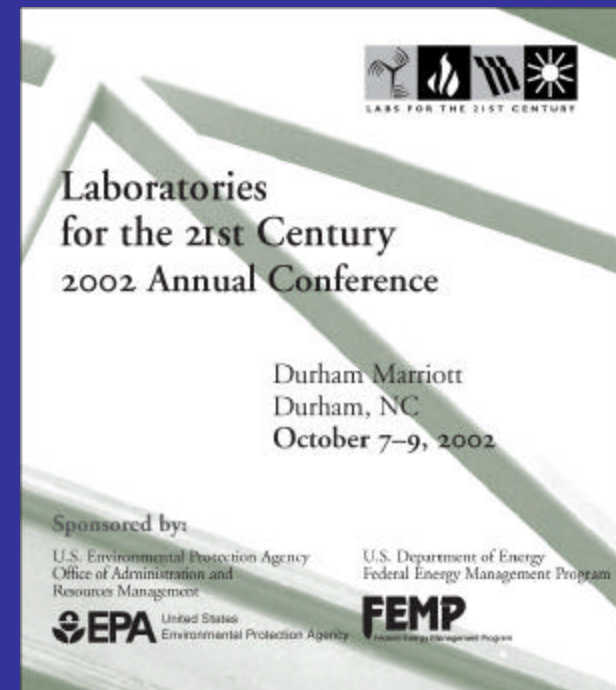& Natural Sciences

Berry College
Rome, Georgia

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LABS FOR THE 21ST CENTURY

Laboratories
for the 21st Century
2002 Annual Conference

Durham Marriott
Durham, NC
October 7–9, 2002

Sponsored by:

U.S. Environmental Protection Agency
Office of Administration and
Resources Management

U.S. Department of Energy
Federal Energy Management Program

EPA United States
Environmental Protection Agency

FEMP

INTRODUCTION

Presentation Outline:

- **Overview of Berry College**

- **The Facility:**
  Berry's School of Mathematics & Natural Sciences

- **Sustainable Design Strategies**

- **Energy Savings**

- **Questions & Answers**

**OVERVIEW OF
BERRY COLLEGE**

Institutional Mission:

Berry College serves humanity by inspiring and educating students. Berry emphasizes a comprehensive educational program committed to high academic standards and practical work experience in a distinctive environment of natural beauty.

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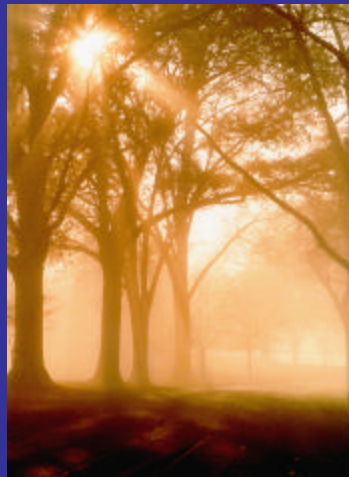**Planning | Architecture | Interiors
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OVERVIEW OF
BERRY COLLEGE

Campus Setting:

Berry offers an unusually beautiful
environment for learning with 28,000
acres of land. Fields, forests, lakes,
and mountains provide scenic
beauty in a protected natural setting.

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**OVERVIEW OF
BERRY COLLEGE**

100th Anniversary
of Berry College

Brief History:

- Founded in 1902 by Martha Berry (1866-1942)

- A girls' school was added in 1909

- Establishment of a junior college in 1926

- Became a four-year college in 1930

- Added graduate programs in 1972

Campbell School
of Business

The Charter School
of Education &
Human Sciences

Evans School
of Humanities &
Social Sciences

School of
Mathematics &
Natural Sciences

Now a comprehensive college offering undergraduate and graduate programs, became one of the nation's most successful educational experiments combining academic study and student work and is a model for many institutions in the United States and abroad.

THE FACILITY

First Floor Plan

19 Lecture Classrooms

18 Classroom Labs

Biology, Chemistry, Computer
Science, Earth Sciences, Physics
and Astronomy

Core Research Facilities

Discipline-Specific
Research Labs

Administrative &
Faculty Offices

Support Spaces

THE FACILITY

Second Floor Plan

Multi-Disciplinary Thinking:

- Biology; Chemistry; Physics; Environmental / Earth Science;
  Mathematics; Computer Science; General Classrooms

- Interactive Spaces
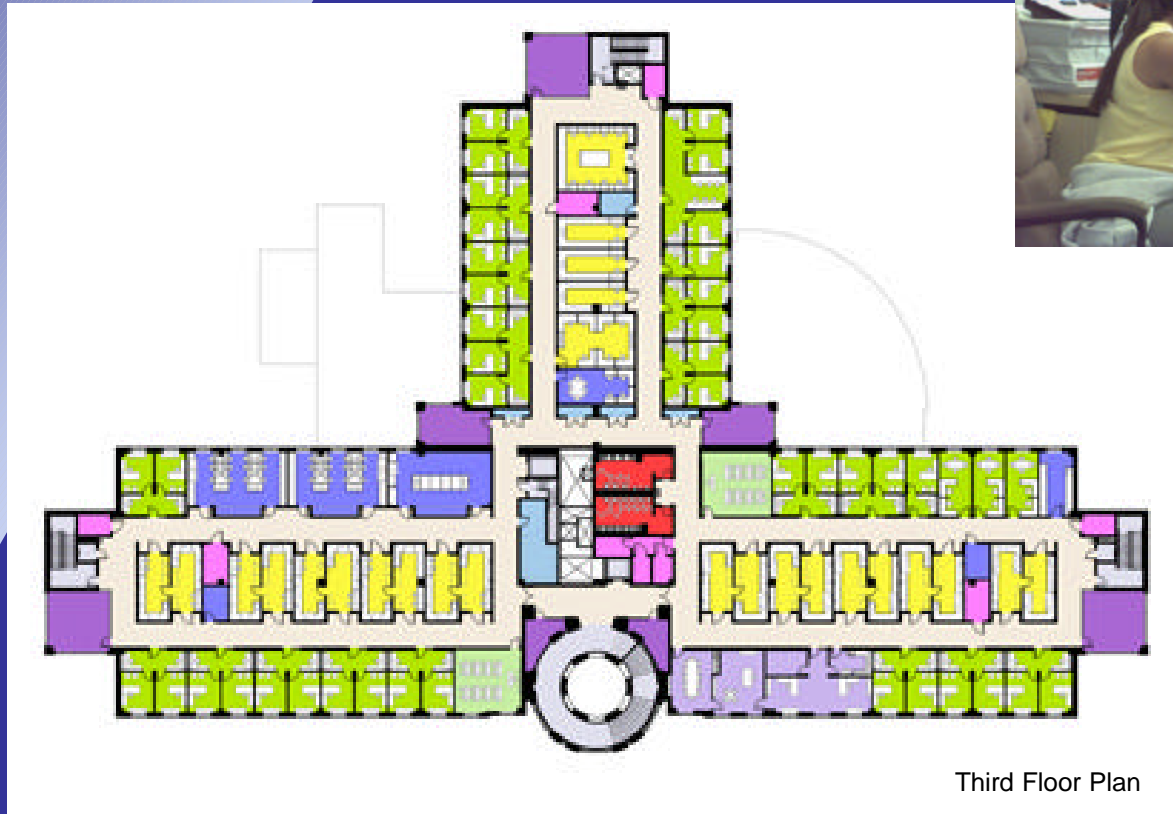
- Problem Seeking /
  Problem Solving Team Environment

Third Floor Plan

Team / Independent Research:

- Support / Required

- Real World Experience for Under Graduates

- Application of Fundamentals

- Problem Seeking / Problem Solving Process

Opportunities for Real World research experience:

- Involvement in faculty research projects

- Practical experience in the lab

- Experience with all aspects of research including grant writing

- Building serves as a teaching tool

Third Floor Plan
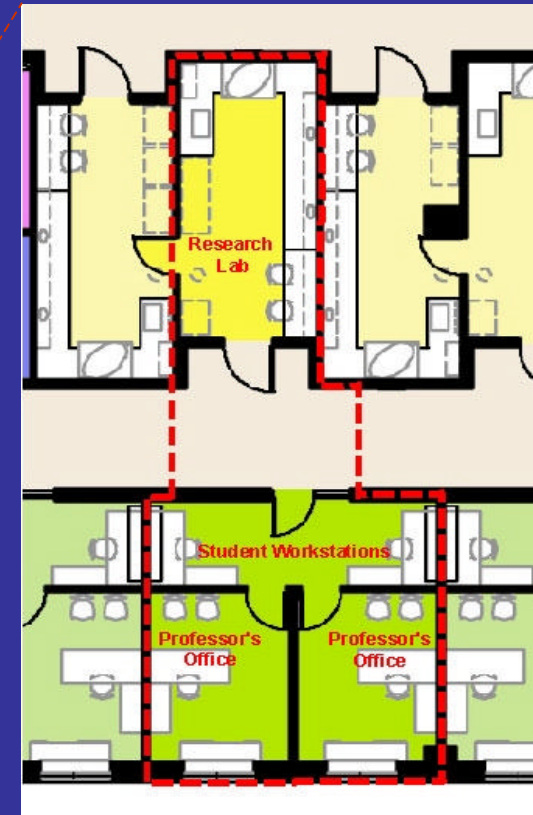
Research Lab

Student Workstations

Professor's Office

Professor's Office

SUSTAINABLE
DESIGN STRATEGIES

- **Minimize site disruptions**
  - Save existing trees by distributing required parking zones
  - Re-use removed trees in new landscaped areas

- **Designed life-span of systems & materials: 50 years**

- **"Green" Interior Finishes**
  - Low VOC
  - Recycled content

- **Water Conservation**
  - Water-less Urinals
  - Potable water from on-site source

- **Use of Day-lighting**

- **Energy-Efficient Lighting Systems**
  - Motion/Occupancy Sensors

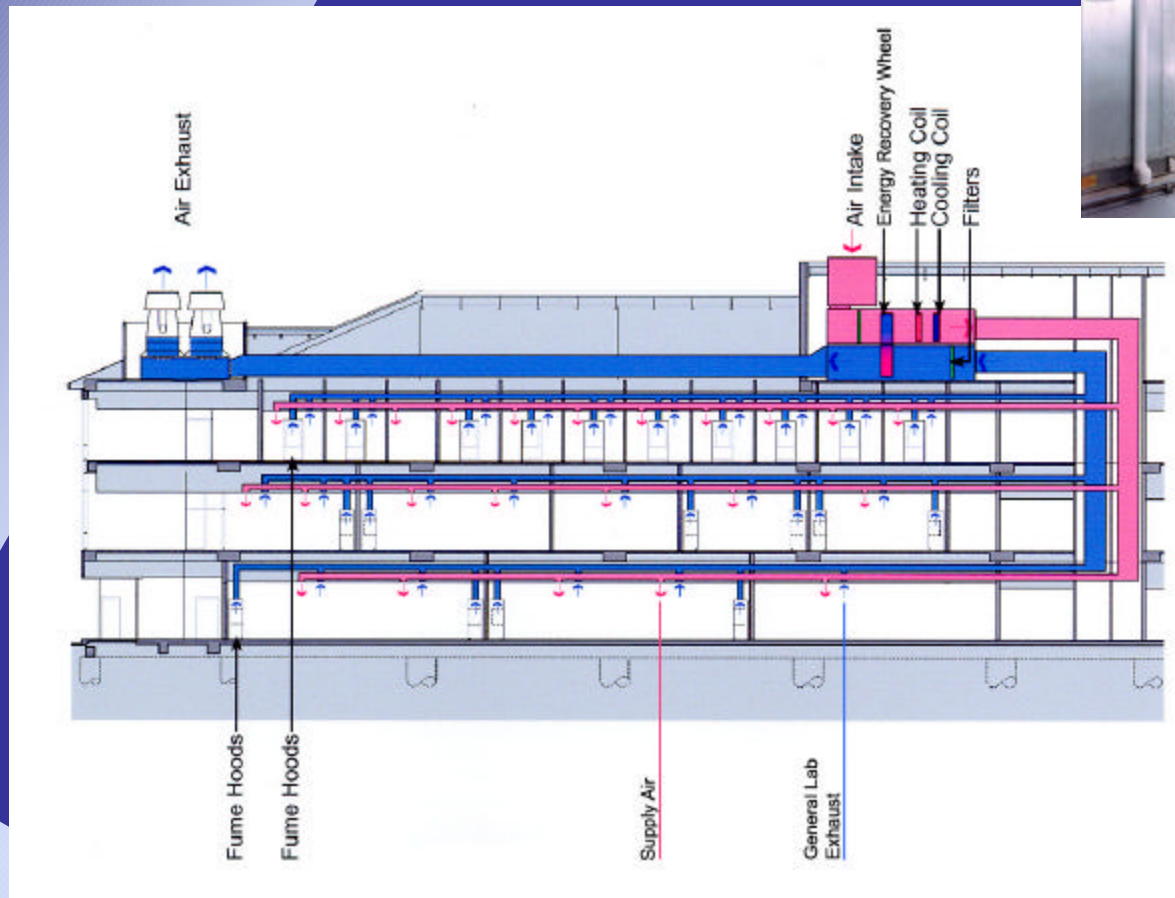- **Recycle Construction Waste**
  - Re-useable formwork

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Energy Recover System

- Enthalpy Recovery Wheels in 100% Outside Air AHU

ENERGY SAVINGS

Zone	Without Energy Recovery		With Energy Recovery		Total Savings $ / year
	Cooling	Heating	Cooling	Heating	
AHU-1	143 tons	64 BHP	73 tons	19 BHP	$ 8,600
AHU-2	143 tons	64 BHP	73 tons	19 BHP	$ 8,600
AHU-3*					
AHU-4	69 tons	31 BHP	35 tons	9 BHP	$ 4,250
AHU-5	69 tons	31 BHP	35 tons	9 BHP	$ 4,250
AHU-6*					
AHU-7*					
AHU-8	23 tons	11 BHP	12 tons	4 BHP	$ 1,700

* Indicates zones that have low outside air requirements

Total Savings   219 Tons   141 BHP $27,400 / year

Net Cost Increase: $135,000

Payback: 4.9 years

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Questions / Discussion